

**WHAT IS CLAIMED IS:**

1. A method of growing a metal oxide film on a substrate by atomic layer deposition comprising:

5 (i) introducing separate pulses of metal alkyl amide and ozone into a reaction chamber containing a substrate, wherein said metal is a Group 4 metal Hf, Zr, Ti; and

(ii) repeating step (i) until a film of a target thickness is achieved.

10 2. The method of claim 1, wherein the metal oxide is hafnium oxide.

3. The method of claim 1, wherein the metal alkyl amide has the formula  $M(NR^1R^2)_4$ , wherein M represents a Group 4 metal,  $R^1$  is an ethyl unit, and  $R^2$  is a methyl unit.

15 4. The method of claim 1 wherein the substrate is silicon.

5. A method of forming a gate insulator for a transistor comprising:

20 (i) growing a metal oxide mono layer on a substrate by atomic layer deposition by introducing separate pulses of a metal alkyl amide and ozone into a reaction chamber containing a substrate, wherein said metal is a Group 4 metal;

(ii) repeating step (i) until a dielectric film of a target thickness is achieved; and

(iii) positioning a conductive layer over the dielectric layer.

25 6. The method of claim 5, wherein the metal oxides are hafnium oxide, zirconium oxide and titanium oxide.

7. The method of claim 5, wherein the metal alkyl amide has the formula  $M(NR^1R^2)_4$ , wherein M represents a Group 4 metal,  $R^1$  is an ethyl unit, and  $R^2$  is a methyl unit.

30 8. The method of claim 5 wherein the substrate is silicon.

9. A method of forming a capacitor comprising:

- 5 (i) forming a metal oxide mono layer by atomic layer deposition by introducing separate pulses of a metal alkyl amide precursor and ozone into a reaction chamber containing a substrate, wherein said metal is a Group 4 metal;
- (ii) repeating step (i) until a film of a target thickness is achieved; and
- (iii) positioning said film between two electrodes.

10 10. The method of claim 9, wherein the metal oxides are hafnium oxide,  $ZrO_2$ , and  $TiO_2$ .

11. The method of claim 9, wherein the metal alkyl amide has the formula  $M(NR^1R^2)_4$ , wherein M represents a Group 4 metal,  $R^1$  is an ethyl unit, and  $R^2$  is a methyl unit.

15 12. The method of claim 9, wherein the substrate is one of the two electrodes.